

储层沥青成因及其对油气运聚的影响——以鄂尔多斯盆地华庆地区长8油层组1砂组为例

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Reservoir bitumen genesis and its impacts on hydrocarbon migration and accumulation:a case study from Chang 8¹ of Yangchang Fomation in Huaqing area,the Ordos BasinChen Shijia^{1,2}, Yao Jingli³, Lu Jungang^{1,2}, Yang Guoping³, Wen Yanchun¹, Zhang Jizhi¹, Shi Zhenghao^{1*}

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摘要

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摘要 鄂尔多斯盆地中部华庆地区三叠系延长组长8油层组1砂组储层孔隙中普遍见沥青,油水关系十分复杂。通过对储层抽提物和原油的地球化学特征分析,并结合含沥青岩心洗油前后储层物性对比实验和储层显微荧光分析,系统研究了该区储层沥青的成因及其对储层物性和油气运聚的影响。研究表明,储层沥青与原油成因不同,沥青成熟度低,且具有强烈生物降解特征。通过洗油实验,含沥青较多的岩心孔隙度和渗透率均有增加,且后期油主要分布在沥青充填后的残余孔隙中,指出沥青对储层物性和后期油气的运聚具有重要的控制作用。长8¹储层存在两期成藏,时间分别在中晚侏罗世和早白垩世末。早期成藏的成熟度较低的原油遭强烈生物降解形成沥青,与绿泥石和铁方解石一起充填在储层孔隙中,使储层变得更为致密,源岩后期生成的成熟原油只能进入被沥青等充填后的残余孔中或进入沥青少的储层孔隙中聚集成藏。

关键词: 生物降解 沥青成因 储层物性 油气运聚 华庆地区 鄂尔多斯盆地

Abstract: Bitumen is common in the pores of Chang 8¹ pay zone of the Triassic Yanchang Formation in Huaqing area of the central part of Ordos Basin, and the oil-water relationship is very complicated. According to the analysis on the geochemical characteristics of reservoir extracts and crude oil, combining with comparative test on the reservoir physical property of cores containing bitumen before and after washing oil and the reservoir fluorescence analysis, authors studies in detail the reservoir bitumen genesis and its impact on reservoir physical property and hydrocarbon migration and accumulation in this area. The results show that the genesis of reservoir bitumen and crude oil are different, and the bitumen has lower maturity with strong biodegradation. Base on the experiment of washing oil, it is found that both the post-washing porosity and permeability of cores containing bitumen increase significantly, and the oil formed in late stage mainly distributes in the residual pore filled with bitumen. It is pointed out that bitumen has an important control on reservoir physical property and hydrocarbon migration and accumulation at late stage. The Chang 8¹ formation experienced hydrocarbon two accumulation stages, the first stage happened in Middle-Late Jurassic and the second in Early Cretaceous. The early accumulated crude oil with low maturity suffered from strong biodegradation and were turned to bitumen, which filled in the pores of reservoir together with chlorites and ferrocals, making the reservoir tighter. The mature oil generated from the source rocks in late stage could only accumulate in the residual pores filled with bitumen or in pores of reservoir with less bitumen.

Keywords: Biodegradation bitumen genesis reservoir physical property hydrocarbon migration and accumulation Huaqing area Ordos Basin

Received 2011-03-08;

Fund:

国家科技重大专项 (2011ZX05001-001); 国家重点基础研究发展计划("973"计划)项目 (2006CB202305)。

引用本文:

陈世加, 姚泾利, 路俊刚, 杨国平, 文延春, 张纪智, 石正灏. 储层沥青成因及其对油气运聚的影响——以鄂尔多斯盆地华庆地区长8油层组1砂组为例[J] 石油与天然气地质, 2012, V(1): 37-44

Chen Shijia, Yao Jingli, Lu Jungang, Yang Guoping, Wen Yanchun, Zhang Jizhi, Shi Zhenghao. Reservoir bitumen genesis and its impacts on hydrocarbon migration and accumulation: a case study from Chang 8¹ of Yangchang Fomation in Huaqing area, the Ordos Basin[J] Oil & Gas Geology, 2012, V(1): 37-44

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